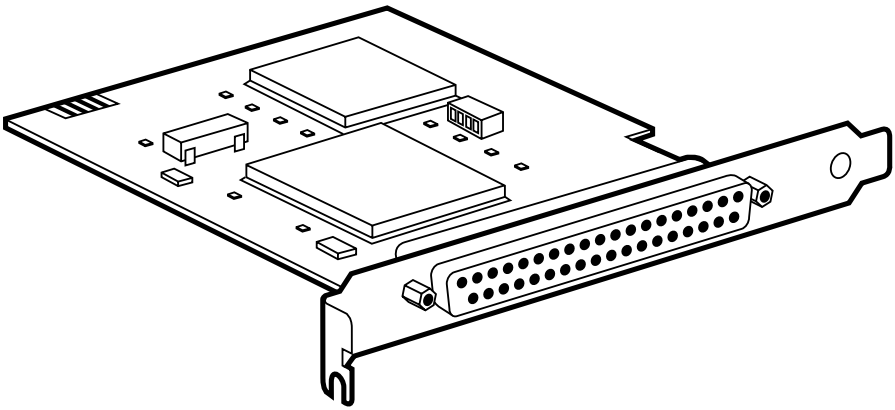
BLACK BOX®
NETWORK SERVICES

DECEMBER 1999
IC903C

Relay/Digital I/O Card—32



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: **www.blackbox.com** • E-mail: **info@blackbox.com**

FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

CE

This product fulfills the requirements of EMC directive (89/336/EEC) and of the low-voltage directive (73/23/EEC) issued by the European Commission. The following European standards must be met:

- EN55022 Class A—"Limits and methods of measurement of radio interference characteristics of information technology equipment"
- EN50082-1—"Electromagnetic compatibility—Generic immunity standard" Part 1: Residential, commercial, and light industry
- EN60950 (IEC950)—"Safety of information technology equipment, including electrical business equipment"

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

TRADEMARKS USED IN THIS MANUAL

Any trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

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1. Specifications

Mean Time Between Failures (MTBF)—> 150,000 hours

Maximum Temperature Tolerance—*Operating*: 32 to 122°F (0 to 50°C); *Storage*: -4 to +158°F (-20 to +70°C)

Humidity—10 to 90% noncondensing

Power—Supply line: +5 VDC; Rating: 500 mA

Size—Including goldfingers: 3.3"H x 4.7" L (8.4 x 11.9 cm); Excluding goldfingers: 3"H x 4.7"L (7.6 x 11.9 cm)

Weight—3.2 oz. (90.7 g)

2. Introduction

2.1 Overview

The Relay/Digital I/O Card—32 provides PC-based control and automation of equipment, such as sensors, switches, satellite systems, and other industrial automation systems. The Card gives the PC four 8-bit ports. The status of each of the four ports is user-selectable as input or output by simply writing a control word to the port register. You can customize the combination of inputs and outputs as needed.

2.2 What the Package Includes

The Card ships with the following items:

- Relay/Digital I/O Card—32
- DIO Software
- This users' manual

If anything is missing or damaged, please call Black Box at 724-746-5500.

2.3 Features

- 32 channels (four ports of eight channels each) of digital I/O configurable as inputs or outputs
- Terminal block and cable kit available to simplify field wiring requirements
- Supports all PCI interrupts

2.4 Software

The Card comes with Windows 95, 98, and Windows NT drivers, with a consistent and straightforward application program interface (API). This DIO software supports popular development environments, including Visual C++, Visual Basic, and Delphi. It also includes a utility for configuring the driver parameters under Windows 95, 98, and Windows NT.

The Relay/Digital I/O Card—32 also supports DOS, QNX, and Linux.

3. Installation

3.1 Card Setup

The Relay/Digital I/O Card—32 is a fully compliant plug-and-play adapter. All card resources (I/O address, IRQ selection) are auto-assigned by either your system BIOS or your plug-and-play operating system.

3.2 Operating-System Installation

Please install the proper software for your adapter before installing the hardware. Refer to the supplied software for the correct operating-system installation procedure.

3.3 System Installation

You can install the Card in any of the PCI expansion slots. Follow these steps:

1. Turn off the power to the PC. Disconnect the power cord.
2. Remove the PC case cover.
3. Locate an available PC slot and remove the blank slot cover.
4. Gently insert the Card into the slot. Make sure that the Card is seated properly.
5. Replace the screw.
6. Replace the cover.
7. Connect the power cord. Installation is complete.

3.4 Register Descriptions

Address	Mode	D7	D6	D5	D4	D3	D2	D1	D0
Base+0	RD/WR	PAD7	PAD6	PAD5	PAD4	PAD3	PAD2	PAD1	PAD0
Base+1	RD/WR	PBD7	PBD6	PBD5	PBD4	PBD3	PBD2	PBD1	PBD0
Base+2	RD/WR	PCD7	PCD6	PCD5	PCD4	PCD3	PCD2	PCD1	PCD0
Base+3	RD/WR	PDD7	PDD6	PDD5	PDD4	PDD3	PDD2	PDD1	PDD0
Base+4	RD/WR	{0}	{0}	{0}	{0}	DIRD	DIRC	DIRB	DIRA
Base+5	RD/WR	IRQEN	IRQST	{0}	{0}	{0}	{0}	IRC1	IRC0
Base+6	RD Only	{0}	{0}	{0}	{0}	{0}	{0}	{0}	{0}
Base+7	RD Only	{0}	{0}	{0}	{0}	{0}	{0}	{0}	{0}

NOTE

All ports are set to input after reset or power up. Interrupt source is Base+0 bit D0. When selecting the Interrupt mode, always disable interrupts before changing or setting states. This will help prevent inadvertent or unexpected interrupts. When using the high and low level interrupts, a change in state of the input must occur before the interrupt can be cleared. The device providing the input to Base+0, bit D0, must do this.

PAD0-7=Port A (Base+0)
PBD0-7=Port B (Base+1)
PCD0-7=Port C (Base+2)
PDD0-7=Port D (Base+3)
DIRA-D=Port A-D direction control (Base+4)
0=input
1=output

IRC0-1=Interrupt Mode select (Base+5)

IRC1	IRC0	
0	0	Low level
0	1	High level
1	0	Falling edge
1	1	Rising edge

IRQEN=enable interrupts (Base+5)
0=disabled
1=enabled (disabled after reset or power up)

IRQST=interrupt status (Base+5)
1=interrupt pending (reading the bit clears interrupt)

50 pin ribbon cable pin out

Description	Pin #	Description	Pin #
Port A		Port C	
A0	47	C0	15
A1	45	C1	13
A2	43	C2	11
A3	41	C3	9
A4	39	C4	7
A5	37	C5	5
A6	35	C6	3
A7	33	C7	1
Port B		Port D	
B0	31	D0	2
B1	29	D1	4
B2	27	D2	6
B3	25	D3	8
B4	23	D4	10
B5	21	D5	12
B6	19	D6	14
B7	17	D7	16
GND	All Even pins from 18		
+5V	49		

Appendix A. Troubleshooting

A.1 Troubleshooting Tips

Following the simple steps listed below can eliminate most common problems.

1. Install the software first. After installing the software, then add the hardware. This places the required files in the correct locations.

2. Identify all I/O adapters currently installed in your system, including your on-board serial ports, controller cards, sound cards, etc. Identify the I/O addresses used by these adapters as well as the IRQ (if any).

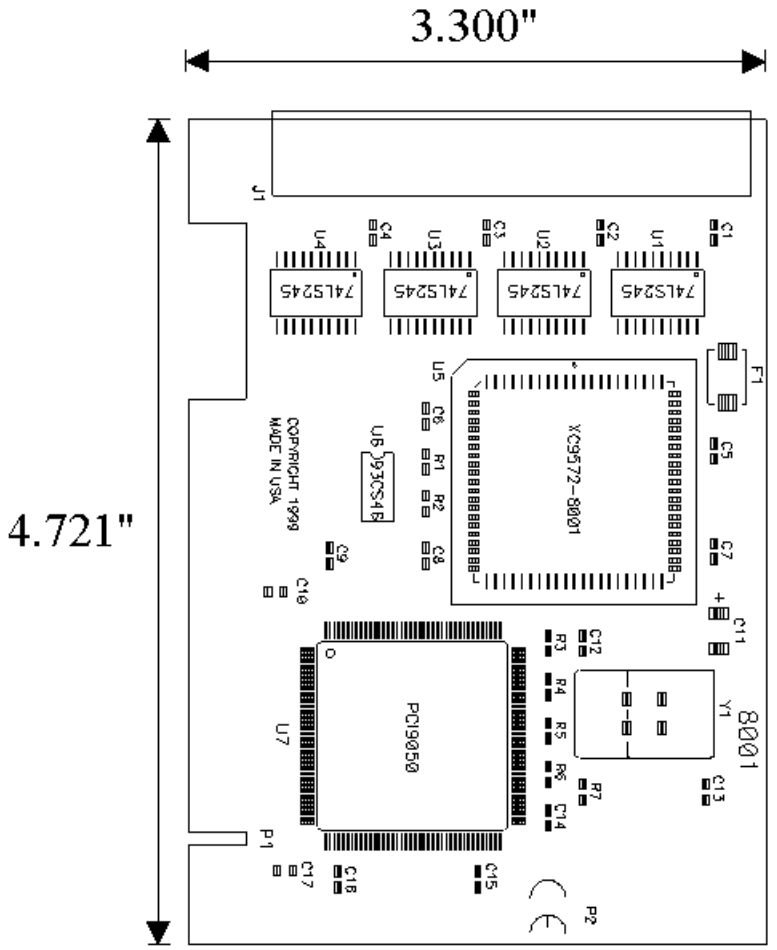
3. Make sure that there is no confilct with currently installed adapters. No two adapters can occupy the same I/O address and may not be allowed to share IRQs.

4. Make sure that the Relay/Digital I/O Card—32 is securely installed in a motherboard slot.

A.2 Calling Black Box Technical Support

If you still have problems with your Relay/Digital I/O Card—32 after trying the steps listed above, call Black Box Technical Support at 724-746-5500.

Appendix B. Board Layout



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